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Exchange Rate Volatility and Inflation: The Nigerian Experience

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Abstract
This paper investigates the impact of inflation on real exchange rate volatility in Nigeria, using a quarterly data of 181 series from the first quarter of 1970 all through to the last quarter of 2014. The models used in this work are GARCH (1, 1) model and granger causality in Vector Auto-Regressive environment. The conditional variance of the volatility in the real exchange rate at time t was found with the use of GARCH (1, 1) model to be susceptible to its conditional variance in the previous time period, the squared error term in the previous time period, the inflation rate, imported inflation, broad money supply and the lagged nominal exchange rate. The granger causality test shows that there is a un-directional causality running from inflation to real exchange rate volatility and there is a causality running from the whole sample variable to imported inflation which is proxied with import; an indication that there is a relationship between imported inflation, real exchange rate volatility and other sample variables. This study therefore recommends that the monetary authority should institute an inflation targeting policy to control the fluctuation in the price level as well as other macroeconomic variable that have a direct effect on the exchange rate. Government should also implement other macroeconomic policies that will help reduce the degree of volatility in the exchange rate.
Keywords: Exchange Rate, Volatility, Inflation Rate

1.0 INTRODUCTION

The high level of exchange rate volatility in the world market, particularly the Naira/Dollar exchange rate especially in the recent past is not only alarming but economically threatening. This has led to a number of questions and interest amongst economists as to the causes of this volatility especially under a floating exchange rate regime such as ours, hence necessitating the need for this research work at times like this. Exchange rate which refers to the price of one currency (usually the domestic currency) in terms of another currency is the quantity of another currency that could be purchased with a given unit of another currency. The role exchange rate plays in international economic transactions cannot be overemphasized because no nation can be economically self-sufficient due to varying factor endowment. Movements in the exchange rate have undulating effects on other macro-economic variables such as interest rate, inflation rate, unemployment, money supply, etc. This volatility can cause among other things balance of payment disequilibrium which have the tendency of bringing in inflation in case of depreciation or unemployment in case of appreciation within the economy. Apart from its inflationary tendencies, the fact that exchange rate fluctuation discourages trade and can create unemployment in the system is very certain. Take for instance, when contracts are signed to finance international trade in goods and services, the usual risks when considering whether such will result in profit being earned will be accessed. Under a floating exchange rate regime, an extra risk is added to the transaction so as to be able to account and cover any extra cost when there is a sudden fluctuation in the exchange rate. If this is not properly done, the sudden fluctuation might upset the calculated profits, hence wiping out the estimated profits. This also is highly inflationary and high inflation is generally harmful to the entire economy of any country.

The fluctuation in the exchange rate can further be threatened if there is an already existing high level of inflation in the system coming from both the demand and the supply sides. In the words of Milton Friedman an American monetary Economist “Inflation is always and everywhere a monetary phenomenon”, (M. Friedman, 1968). A rise in money supply is always believed by the monetarists to cause a proportionate rise in price level and as the rise in the price level persists, the tendency is that the domestic goods and services produced within the country will become less competitive both within and outside the country when compared with other countries’ output, hence, loosing market both within and outside the country. As a result, import will increase and export will fall. This entails that purchasers of the country’s goods will demand less of their currency to settle account with them while consumers within the country will be supplying more of their local currency to settle account with the outside world. The fall in the demand and rise in the supply of the local currency will lead to depreciation of their exchange rate. However, a depreciating currency will mean that the price of the country’s export will fall while the price of imports will rise. Overtime, the volume of import will fall since import has become more expensive and the volume of export will rise since export has become relatively cheaper, hence, depreciation in the exchange rate can turn to appreciation in the country’s exchange rate. A vicious circle can emerge leading to more uncertainties in the foreign exchange market.

The relationship between inflation and exchange rate and the mechanism through which depreciation in the exchange rate turns to appreciation and vice versa with no direct and deliberate action by the government to effect some changes however depends greatly on a number of factors: the system of exchange rate prevalent in

the country, the macroeconomic objectives of the government, the degree of the economy's openness and how mobile capital is in that economy. The exchange rate regime plays a key role in reducing the risk of fluctuations in the real Exchange rate which will affect the rate of inflation and vice versa. Therefore the need to reduce and stabilize inflation has been one of the major interests of the central bank of Nigeria even since 1970 till date. (CBN Statistical Bulletin 2010).

2.0 Literature Review and Theoretical Framework

2.1 Literature Review

In the management of exchange rate, there are two basic method namely fixed and flexible exchange rate regimes. Exchange rate regimes refer to different systems of managing the exchange of a nation's currency in terms of other currencies. According to Obadan (1996), fixed exchange rates are to promote certainty and orderliness in foreign exchange markets and of course in international trade transactions. A flexible exchange rate system is one which the exchange rate of a country is at any time determined by the interaction of the market forces of demand and supply for foreign exchange with different degrees.

Several empirical studies that have undertaken to identify the possible determinants of exchange rate volatility and its consequences in Nigeria and elsewhere have identified inflation rate as another exchange rate determining variable. Honoham and Lane (2003) for instance, reported a variety of regressions, explain annual inflation differentials across the Eurozone over the period 1999-2001, and found a substantial role for the variation in nominal effective exchange rate movements in explaining divergent inflation rates and vice versa. Honoham and Lane (2004) in a related study confirm that exchange rate accounts for EMU inflation rates during the periods of Euro appreciation (2002-2003) as well as during the periods of Euro depreciation (1999-2001). Aigbokhan (1991) showed that the level of real exchange rate was a primary determinant of the rate of inflation in Mexico during the 1980s and 1990s.

Exchange rate as the price of one currency in terms of another is the amount of foreign currency that may be bought for one unit of the domestic currency or the cost in domestic currency purchasing one unit of the foreign currency (Soderstine, 1998). It is the rate at which one currency exchanges for the other, and it is used to characterize the international monetary system (Iyoha, 1996). Anifowose (1994) opines that foreign exchange as a monetary asset is used on a daily basis to settle international transactions and to finance deficits in a country's balance of payments. He stresses that in addition to holding of monetary gold and special drawing rights (SDRs), foreign exchange is an important component of a country's stock of external reserve.

Udoh and Egwaikhide (2008) in looking at the effect of exchange rate volatility and inflation uncertainty on foreign direct investment in Nigeria observed that exchange rate volatility and inflation uncertainty exerted significant negative effect on foreign direct investment during the period. Their findings also show that inflation and exchange rates exhibited high volatility. Volatility in the inflation and exchange rates increased uncertainty and risk element facing foreign investors and thus adversely affected foreign investment in the country. This suggests that as foreign direct investment dwindles, the balance of payment will worsen not only in its current account but also in its capital account. Kiguel and Ghei (1993) also show that exchange rate affects balance of payments, having used the ratio of non-gold reserve to import to study the impact of devaluation on the balance of payments. Their results show that the reserve position of the devaluing country improves as a result of devaluation. This means that devaluation improves the balance of payments, since an improvement on the reserve position constitutes an improvement on the balance of payments position.

Obaseki (1991) observes that foreign exchange can be acquired by a country through exports of goods and services, Foreign Direct Investment (FDI) flow or external loans, aids and grants which can be used in settling international obligations. Hence the need for a country to have and manage adequately its foreign reserve is being strengthened here because when there is disequilibrium in the foreign exchange market as a result of inadequate supply of foreign services, there will be pressure on foreign exchange reserves, and if the it's not adequate, this may deteriorate into balance of payments problems.

Imimole and Enoma (2011) examined the impact of exchange rate depreciation on inflation in Nigeria for the period 1986–2008, using Auto Regressive Distributed Lag (ARDL) Cointegration Procedure. He found that exchange rate depreciation, money supply and real gross domestic product are the main determinants of inflation in Nigeria, and that Naira depreciation is positive, and has significant long-run effect on inflation in Nigeria. This implies that exchange rate depreciation can bring about an increase in inflation rate in Nigeria and that inflationary rate in Nigeria has a lagged cumulative effect. They recommend that Naira depreciation policy should be combined with other macroeconomic policies to stabilize the volatile inflationary rate in Nigeria. However, their work did not full consider the pre-SAP period when exchange rate was relatively stable overtime, maybe because at this time, it was not freely floating, therefore this work will incorporate both the pre- SAP and post-SAP periods to verify the assertions of Imimole and Enoma as well as ascertain the major macroeconomic disturbances to exchange rate volatility. Noer, Arie and Piter (2010) conducted a comparative investigation of the relationship between inflation rate and the Real Exchange Rate. With the use of an investigative statistics and

granger causality test, they found a strong correlation between the movements of inflation rate and the Real Exchange Rate in most countries that were investigated. Having used data covering 1986-2008 and adopting the auto- regressive distributed lag model (ARDL) and cointegration techniques. Ojo (1990) stresses that international experience has shown that no country leaves its exchange rate determination completely to market forces alone as some level of intervention is applied from time to time as situation demands.

Victor and Samuel (2012) in assessing the relationship between the real exchange rate and inflation in Nigeria observed a long run relationship between inflation and the real exchange rate. The speed of adjustment indicated by the error correction model conducted by them further supports this long run relationship. The result showed that both domestic and imported inflation appreciated the real exchange rate and the ARCH result indicates the persistence of volatility between the rate of inflation and the real exchange rate, an indication that the real exchange rate in Nigeria has been susceptible to fluctuation in the rate of inflation. They recommend that since imported inflation is one of the major causes of real exchange rate volatility, policies to stabilize real exchange rate by targeting inflation should be combined with policies to increase export and production of previously imported inputs to reduce the problem of imported inflation.

Obadan and Nwobike (1991) are of the opinion that some countries with a fluctuating balance of payments position adopt multiple exchange rate systems as an alternative to devaluation; this is considered as being too costly to manage from a political or social perspective. However, they emphasize that a rationalized and properly administered dual exchange rate system can be very helpful to developing countries for ensuring the satisfaction of basic needs, ensuring fixed and balance of payments viability and general resource mobilization.

Kamin and Khan (2003) empirically investigated the multi-country comparison of the correlation between inflation and exchange rate competitiveness found that a relationship exists between inflation rate and the RER in most Asian and Latin American countries. Their study further revealed that the influence of exchange rate changes on inflation rate is higher in Latin American countries than those in Asia and industrialized countries. Omotor, (2008) in his study of exchange rate reforms and its inflationary consequences, found, using annual time series data covering the period 1970 to 2003, that exchange rate policy reforms is important in the determination of inflation in Nigeria. Khan and Lizondon (1987) observe that countries experiencing balance of payments problems should embark on devaluation or gradual depreciation of her currency to effect a change on the payments problems, since devaluation which is the reduction of the value of one's country is expected to have significant impact on international capital movements. Cooper (1978) examines the effect of devaluation on the balance of payments of some developing countries. He discovers that three quarter of the cases examined showed that the current account of the balance of payments improved. This implies that devaluation leads to higher exports and lowers imports, which in the long run would improve the balance of payments position of a country. Iyoha (1996) considers devaluation as the deliberate reduction of the value of a country's currency in terms of other currencies. It is an increase in the exchange rate from one par value to another and could be used as a policy instrument by a nation under a fixed exchange rate system to correct a surplus of deficits in its balance of payments.

Olisadebe (1991), however, is of the opinion that the relationship between exchange and balance of payments arises out of international exchange, which determines the amount of payments involved in economic transactions. Obaseki (1991) observes that foreign exchange resources are derived and expended in the course of effecting economic transactions between the residents of one country and the rest of the world. He opines that there is a close link between foreign exchange transactions and the balance of payments; but while foreign transactions reflects cash flow arising from internal operations, the balance of payments exhibit the dual movement of goods and services. Donovan (1981) study, however, suggests that devaluation would improve the current account without significant import liberalization.

From the literatures reviewed, we observe that most of the works that studied the relationship between exchange rate and inflation are of foreign origin. They did not really consider inflation causing exchange rate but vice versa. Evidences have shown that a bi-causality effect can emerge between exchange rate and inflation since a vicious circle between them is as well possible. Moreover, most of the works did not look at the volatility in exchange rate but only considered the nominal exchange rate. These are some of the points of departure of this paper which reflects the true international competitiveness of Nigeria. The study also used data covering the pre-SAP, SAP and post -SAP periods and also adopts more recent econometric methods of estimation. Hence, the study objective is coined thus.

Research Objectives: The main objective of this study is to ascertain the impact of inflation on exchange rate volatility in Nigeria. However, the specific objectives are:

i) To identify the macroeconomic variables that impacts on exchange rate volatility in Nigeria.
ii) To assess the nexus between exchange rate volatility and inflation in Nigeria.

2.2 Theoretical Framework

The theoretical issues on which exchange rate volatility and inflation effects hinges is provided by those theories, which deal with the adjustment mechanism of Balance of payments as it relates to internal and external balance. Such theories have existed in international trade theory as far back as 1752. Some of these policies include the elasticity approach, the absorption or Keynesian approach, and the monetary approach.

2.2.1 The Elasticity Approach

The elasticity approach is associated with the Marshall-Lerner condition. It studies the conditions under which exchange rate changes restore equilibrium in BOP by devaluing a country's currency. It states that: when the sum of price elasticities of demand for exports and imports in absolute terms is greater than unity, devaluation or depreciation of currency will improve the country's balance of payment. This is given as: $e_x + e_m > 1$

Where e_x is the demand elasticity of exports and e_m is the demand elasticity for imports. In addition, if the sum of price elasticities of demand for exports and imports, in absolute terms is less than unity, devaluation or depreciation will worsen BOP. Again, if they are equal to unity, devaluation will have no effect on the BOP. However, there is a general consensus among economists that if there is high level of inflation in the country, devaluation of the currency will still worsen the BOP even though the combined price elasticities of its demand for imports and exports are greater than unity and that Marshall-Lerner condition can only be satisfied in the long run, meaning that devaluation will first worsen BOP in the short run before correcting it, thus the *j-curve effect*. This is because the effect of devaluation on domestic prices and demand for exports and imports will take time for consumers and producers to adjust to the new situation. Therefore, the need to ascertain the short run and long run causality effect of exchange rate and inflation is one of the interests of this work. The absorption approach states that if a country is absorbing more than they produce, their BOP will be deficit and vice versa. Therefore, BOP can be improved by either reducing absorption and/or increasing income. Moreover, with inflation in the system, the real income can fall even when nominal income is rising and BOP can still worsen. The worsening BOP will affect the exchange rate which in turn will bring more inflation in the system and a vicious circle will emerge. The aim of expenditure reducing policies is to reduce domestic absorption or expenditure on consumption and investment and thereby releases goods for export, while leaving aggregate output unchanged. On the other hand, the aim of expenditure switching policy is to switching domestic demand from imported to home made goods (Komolafe, 1996). This can be done with the use of protectionist instruments such as tariff, import quota, etc. The extent to which the switching is achieved depends on elasticity of supply and demand for tradable goods. However, expenditure – reducing policies have costs in terms of loss of output, investment and employment (Olisadebe, 1991). The loss would be minimized if resource can be easily moved to the tradable goods sector. Alternatively, bridging external loans may be contracted to sustain an acceptable level of investment and output.

2.2.2 The Monetary Approach

The monetary policy is effective under flexible exchange rate regime but ineffective under fixed exchange rate regime (jhingan 1983). Consider the effect of monetary policy under floating exchange rates with relative capital mobility. If government increases the monetary base, interest rate will fall and income will rise. With a fall in interest rate, capital will flow out of the economy leading to increase in the demand of foreign currency and the country's exchange rate will depreciate. Hence, export volume will rise and import volume will fall as a result of the depreciating exchange rate; the product market improves as the BOP also improves giving rise to both internal and external balance.

3.0 Model Specification

From the review of literature, it has been observed that volatility in real exchange rate depends on domestic inflation, imported inflation proxy by import, money supply, interest rate and the lag of Naira/Dollar nominal exchange rate.

This work is based on the GARCH model as it is used to estimate volatility in variables and the use of Granger Causality in VAR model to estimate whether there is a uni-directional causality or bi-directional causality between inflation and real exchange rate as well as other variables in the model. Adopting the model used by Victor E. Oriavwote and Samuel J. Eshenake(2012) but with some modifications in the variables, the model to be estimated is thus stated below:

Description and Sources of Variables Used

VARIABLES	DEFINITION AND COMPUTATION	SOURCES
Nominal Exchange Rate	Bilateral Exchange rate of Nigeria Naira to US Dollar	Central Bank of Nigeria (CBN) Statistical bulletins
Real Exchange Rate	Nominal Exchange Rate/Consumer Price Index	CBN statistical bulletins
Real Exchange Rate volatility	Standard Deviation of the real exchange rate	CBN statistical bulletins
Interest Rate	Prime Lending Rate	CBN statistical bulletins
Import	Proxy for imported inflation	CBN statistical bulletins
Inflation Rate	Proxy as Consumer Price Index	CBN statistical bulletins
Money Supply	Total Monetary Liabilities (M2)	CBN statistical bulletins

Table 1: Source: Auto's computation

The Mean Equation

$REXRATE = b_o + b_1 CPI\ (-1) + b_2 Log(IMP_t) + b_3 Log(MS_t) + b_4 EXRATE(-1) + U_t$

$b_1<0$, $b_2<0$, $b_3<0$ and $b_4>0$

Where:

REXRATE = Real Exchange Rate
CPI = One Period lag of Consumer Price Index (Proxy for inflation)
IMP = Import representing imported inflation
MS = Money supply
EXRATE(-1) = One Period lag of Naira/Dollar Nominal Exchange Rate
U_t = Random variable

Volatility Estimate: The Variance Equation

This study focused on the impact of inflation in the volatility of real exchange rate in Nigeria. The frequency of data is as defined above. Having generated the real exchange rate from the nominal exchange rate, we derived the real exchange rate volatility (REXRVOL) with the aid of the Generalised Autoregressive Conditional heteroskedasticity (GARCH 1, 1). The jointly estimated GARCH (1,1) model is given as:

$\sigma^2_t = \alpha_0 + \alpha_1 \sigma_{t-1} + e^2_{t-1} + \beta_1 INT_t + \beta_2 CPI_t$

This means that the conditional variance (σ^2_t) of the volatility in the real exchange rate at time t depends on its conditional variance in the previous time period (the GARCH term), the squared error term in the previous time period (ARCH term), the rate of interest and the inflation rate.

4.0 Data Sources and Presentation Of Results

This analysis of interaction between exchange rate volatility and inflation in Nigeria is based on a quarterly data of one hundred and seventy two date series starting from 1970 first quarter to 2014 fourth quarter. This data is gotten from Central Bank of Nigeria (CBN) Annual Reports and statistical Bulletin. The choice of the period is important as it covers the Pre-SAP, SAP, and Post SAP eras which resulted in massive depreciation of the naira. Unavailability of data did not permit the extension of the time profile beyond 2014.

The Summary of the GARCH Result is shown below: Dependent Variable is Rexrate Convergence achieved after 41 iterations

GARCH = C(5) + C(6)*RESID(-1)^2 + C(7)*GARCH(-1) + C(8)*INT + C(9)
*CPI

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-4.955006	0.095814	-51.71492	0.0000
CPI(-1)	0.014739	0.001530	9.635781	0.0000
LOG(IMP)	0.517712	0.042331	12.23013	0.0000
LOG(M2)	0.069742	0.046448	1.501512	0.1332
	Variance Equation			
C	-0.068810	0.038127	-1.804749	0.0711
RESID(-1)^2	1.077335	0.274157	3.929622	0.0001
GARCH(-1)	-0.089017	0.023464	-3.793757	0.0001
INT	0.002360	0.002023	1.166763	0.2433
CPI	0.002588	0.000999	2.590414	0.0096
R-squared	0.854496	Mean dependent var		2.303902
Adjusted R-squared	0.852002	S.D. dependent var		2.280906
S.E. of regression	0.877477	Akaike info criterion		1.888229
Sum squared resid	134.7440	Schwarz criterion		2.048488
Log likelihood	-159.9965	Hannan-Quinn criter.		1.953213
Durbin-Watson stat	0.210854			

The result of the ARCH test shown in table 4 above shows that the entire variables under consideration affects the volatility of real exchange rate in Nigeria for the period under consideration except interest rate and Log of broad money supply. This could imply that monetary instruments have not being able to impact or affect the volatility of exchange rate in Nigeria for the Period considered in this work. Hence, there is an indication of the persistence of volatility between the rate of inflation and the Rexrate. This is an indication that the Rexrate in Nigeria is predisposed to fluctuations in the general price level.

Summary of Granger Causality Test Result

Null Hypotheses	F-Statistics	Probability
Dependent Variable: EXRATE	Chi-sq	Prob.
CPI does not granger cause EXRATE	0.323452	0.5695
LOG(IMP) does not granger cause EXRATE	4.129275	0.0421
INT does not granger cause EXRATE	0.342219	0.5586
LOG(M2) does not granger cause EXRATE	0.870171	0.3509
ALL	6.272072	0.1797
Dependent Variable: CPI		
EXRATE does not granger cause CPI	5.805470	0.0160
LOG(IMP) does not granger cause CPI	0.142255	0.7060
INT does not granger cause CPI	0.198459	0.6560
LOG(M2) does not granger cause CPI	0.002190	0.9627
ALL	7.716632	0.1025
Dependent Variable: LOG(IMP)		
EXRATE does not granger cause LOG(IMP)	1.427086	0.2322
CPI does not granger cause LOG(IMP)	1.353945	0.2446
INT does not granger cause LOG(IMP)	4.433434	0.0352
LOG(M2) does not granger cause LOG(IMP)	14.23391	0.0002
ALL	23.50188	0.0001
Dependent Variable: INTEREST RATE		
REXRATE does not granger cause INT	0.674223	0.4116
CPI does not granger cause INT	0.996195	0.3182
LOG(IMP) does not granger cause INT	3.269103	0.0706
LOG(M2) does not granger cause INT	0.006602	0.9352
ALL	10.03585	0.0398
Dependent Variable: LOG(M2)		
EXRATE does not granger cause LOG(M2)	1.828319	0.1763
CPI does not granger cause LOG(M2)	9.791187	0.0018
LOG(IMP) does not granger cause LOG(M2)	3.663794	0.0556
INT does not granger cause LOG(M2)	0.087563	0.7673
ALL	12.75650	0.0125

5.0 CONCLUSION

This study which covers the period between 1970 and 2014 is based ascertaining the inflationary effect on real exchange rate volatility. Both domestic and imported inflation where considered. The domestic inflation was proxy with the consumer price index whereas the imported inflation was captured with the use of import value. The period covered in the work is necessary as it embraces the Pre-SAP, a time when little or no fluctuation occurred in the Naira/Dollar exchange rate; SAP period which is a period of real structural changes in the economy of the country and the post SAP period when the exchange rate of Naira started to experience serious depreciation. In order to ascertain the inflationary effect of the volatility in exchange rate, the researchers adopted the use of ARCH to estimate whether there is a causality running from inflation to exchange rate and vice versa, the Granger causality test in the VAR environment were used. The results show that virtually all the sample variable except interest rate and money supply is highly responsible for the volatility in real exchange rate for the period under consideration. However, whereas there is a causality running from real exchange rate to consumer price index (CPI) which is a proxy for domestic inflation and from imported inflation to real exchange rate, there is no causality running from inflation to real exchange rate, hence the Granger causality test reveal a uni-directional causality running from exchange rate to inflation. This implies that further volatility or to be more précised-depreciation of the Naira exchange rate will trigger more inflationary tendencies within the economy. This is consistent with economic theory.

The researchers therefore recommend that the central policy makers should in addition to inflation targeting policies they employ to stabilize the real exchange rate, also adopt other macroeconomic measures such as increasing domestic production through the attraction of Foreign Direct Investment and improvement of human capital. They should also aim at intervening directly in the foreign exchange market by managing adequately the country's foreign reserve and use it to arrest any unwanted deterioration in the Naira/Dollar exchange rate. With a good foreign reserve, a country can purchase/demand its currency in the foreign exchange market to halt its fluctuation beyond a certain level. This should be the case for Nigeria especially as the study reveals that the Monetary Policy instrument (interest rate) is unable to impact on exchange rate volatility.

Moreover, having observed that monetary policy instruments which are money supply and interest rate

has been completely ineffective in controlling volatility in exchange rate. The researchers also strongly recommend that the monetary authorities should make a readjustment in the monetary policy mix they adopt as well as hold other things constant to ensure its practicability.

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Appendix

	EXRATE	LOG(IMP)	INT	LOG(M2)	CPI
EXRATE(-1)	0.985378	0.002289	-0.007874	0.002105	0.020087
	(0.01660)	(0.00192)	(0.00959)	(0.00156)	(0.00834)
	[59.3744]	[1.19461]	[-0.82111]	[1.35215]	[2.40945]
LOG(IMP(-1))	1.106918	0.675001	0.569113	0.097828	-0.103207
	(0.54473)	(0.06288)	(0.31476)	(0.05111)	(0.27364)
	[2.03206]	[10.7341]	[1.80807]	[1.91410]	[-0.37717]
INT(-1)	-0.049661	0.020635	0.772510	0.002357	-0.018998
	(0.08489)	(0.00980)	(0.04905)	(0.00797)	(0.04264)
	[-0.58500]	[2.10557]	[15.7482]	[0.29591]	[-0.44549]
LOG(M2(-1))	-0.443687	0.207156	-0.022331	0.882433	-0.011180
	(0.47564)	(0.05491)	(0.27484)	(0.04463)	(0.23893)
	[-0.93283]	[3.77278]	[-0.08125]	[19.7737]	[-0.04679]
CPI(-1)	-0.012716	0.003003	-0.012895	-0.006564	1.005220
	(0.02236)	(0.00258)	(0.01292)	(0.00210)	(0.01123)
	[-0.56873]	[1.16359]	[-0.99810]	[-3.12909]	[89.5008]
C	-4.579577	0.819543	-1.852900	0.436699	1.139871
	(2.89539)	(0.33425)	(1.67306)	(0.27166)	(1.45447)
	[-1.58168]	[2.45191]	[-1.10749]	[1.60752]	[0.78370]
R-squared	0.992627	0.952878	0.794678	0.969047	0.994119
Adj. R-squared	0.992414	0.951516	0.788743	0.968152	0.993949
Sum sq. resids	5079.475	67.69239	1696.014	44.71537	1281.788
S.E. equation	5.418591	0.625528	3.131062	0.508400	2.721980
F-statistic	4658.042	699.6654	133.9155	1083.211	5848.512
Log likelihood	-553.4192	-166.9591	-455.2442	-129.8474	-430.1820
Akaike AIC	6.250493	1.932504	5.153567	1.517848	4.873541
Schwarz SC	6.357333	2.039344	5.260406	1.624687	4.980381
Mean dependent	52.00229	11.58370	14.86709	11.58668	51.19777
S.D. dependent	62.21141	2.840851	6.812189	2.848817	34.99158

Determinant resid covariance (dof adj.)	178.0205
Determinant resid covariance	150.1189
Log likelihood	-1718.473
Akaike information criterion	19.53601
Schwarz criterion	20.07021